

SMARA UPDATE



The Quarterly Newsletter of the Department of Conservation - Office of Mine Reclamation

What's New At OMR?

One Mine – One Reclamation Plan

A surface mining operation “shall have no more than one approved reclamation plan applicable to that operation” according to new regulations adopted by the State Mining and Geology Board. Adoption of the regulatory language was preceded by 16 public hearings and workshops held in Sacramento, Burbank, Ventura, and Marysville. California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1, Article 1, Section 3502(d)

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through (i)(2) was added effective November 2, 2002. The regulations apply to operations with more than one reclamation plan approved on or before October 1, 2002 when an expansion or substantial deviation is proposed. These regulations also apply to all plans approved after that date.

California's Surface Mining and Reclamation Act (SMARA) requires that each surface mining operation have an approved reclamation plan. SMARA requires that the plan be amended prior to a “substantial deviation.” When a plan is amended, the SMARA lead agency is required to apply statewide reclamation standards to the amended plan. Rather than approve an amended reclamation plan, lead agencies would sometimes simply approve an additional plan, thereby avoid having to apply reclamation standards to the pre-existing plan. One example cited by the Office of

Mine Reclamation was a single mine that had six reclamation plans.

Under the new regulations, a proposed change or expansion to a surface mining operation that affects the completion of a previously approved reclamation plan, or changes the approved end use, may require that the plan be amended. Factors to be considered by the lead agency in determining if an amendment is required include an increase in the surface disturbance or depth of mining, an extension of the termination date, changes that would affect the end use, and changes inconsistent with previously adopted environmental determinations. In addition, lead agencies may require that a reclamation plan be amended for any other “substantial deviations” from the approved plan.

A mine inspection may trigger the need for an amended reclamation plan if the lead agency finds that site conditions preclude

reclamation in accordance with the approved plan. If, for example, the mine has exceeded its maximum depth or approved surface disturbance, oversteepened cut or fill slopes, or failed to salvage topsoil, an amended plan may be required to ensure successful reclamation.

When a reclamation plan is amended to account for a "substantial deviation," the amended plan must incorporate current reclamation standards for the entire area governed by the plan. If the change is not considered a "substantial deviation," then current standards need only apply to the amended portion of the plan. Areas where reclamation has been "substantially initiated" may be completed according to the previously approved plan.

If an operator with an approved reclamation plan proposes to mine a new and separate area not included in the plan, two options are available.

Option 1: the operator can amend the existing plan or obtain a new approved reclamation plan. If the operator chooses to amend an existing plan, the amended plan must conform to current reclamation standards and encompass all areas to be utilized by the

to current reclamation standards and encompass all areas to be utilized by the surface mining operations. Any areas not included in the amended plan are subject to immediate reclamation.

Option 2: the operator can obtain a new reclamation plan that conforms to current reclamation standards and encompass any facilities, roads, sumps, drainages systems, or storage or processing areas utilized in connection with the new area.

Under option 2, separate facilities located within another lead agency jurisdiction and separated by a highway, stream channel, or other significant physical boundary may be reclaimed in accordance with the pre-existing reclamation plan.

*James Pompy
Environmental Program
Manager*

OMR's New Disturbed Land Rehab Guide

Special Publication 123 – REHABILITATION OF DISTURBED LANDS IN CALIFORNIA: A Manual for Decision-Making

By Gail A. Newton & V.P. Claasen: California Department of Conservation, 2003, 228 pages.

This manual is available free online from OMR's publication

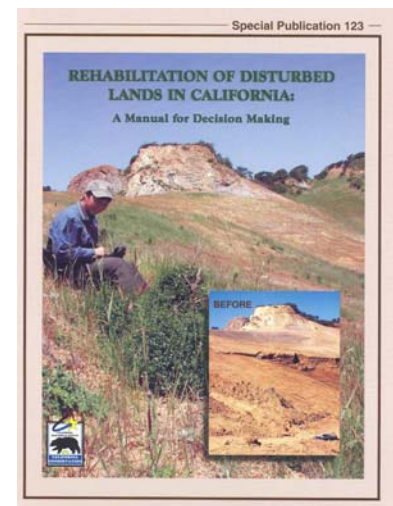
website list at:

<http://www.consrv.ca.gov/OMR>

...or via hardcopy for \$25 from:

California Geological Survey
Publications & Information
Office
801 K Street, MS 14-34
Sacramento, CA 95814-3532

...or available by phone using VISA, MasterCard, or American Express at 916-445-5716.



This manual is a compilation of 20 years of data on revegetation, rehabilitation, and restoration of disturbed lands in California, and focuses on moderately to severely disturbed lands, such as those associated with mine sites. Mined lands often do not rehabilitate naturally in the short-term. This guidebook is designed for land rehabilitation projects that cover a wide variety of situations.

Rather than provide directions on rehabilitating specific situations – California is much too environmentally diverse to cover all situations in a single book – the manual is intended as an aid in determining what would be the most logical and practical plan to rehabilitate a given site.



What's New in OMR?

Since my arrival in July 2001, I would say that just about everything in OMR has changed, and changed for the better. The most obvious visible change is the newly remodeled office for the staff at OMR. Finally, we are able to move around within the office without the fear of box-loads of active mine files tumbling down on top of us. A second apparent change is the newly designed webpage (www.consrv.ca.gov) that provides information about all of the activities in which OMR is a part. In the web space available, we try to highlight as much information as possible about what we do – or at least – provide the necessary information so that lead agencies and the public can get answers to questions regarding both active and

abandoned mines. Another change, a little less visible but significant none-the-less, is a new database that is being built and coming online at this time. With this new database, ongoing business processes are undergoing modification and made more efficient so that turn around time for feedback on annual reports and lead agency inspections can be provided in a timely manner.

A welcome change to OMR is the difference in attitude of the staff working here. For a variety of reasons there has been a turnover in the staff at OMR. Today's individual staff members are enthusiastic, aggressive, and highly professional in their conduct of SMARA related issues, both inside the office and on the outside. These staff hardly have the time to acknowledge either the State's budget woes or the political intrigue involved with the recall election. Each person within OMR has a full plate of tasks to perform – either as an individual or as part of a team – in order to maintain essential services to lead agencies and the public. The fact that they perform these tasks in a most professional manner while still maintaining a positive attitude about being a civil servant is remarkable.

The most significant change in OMR is the relationship it is

building with lead agencies. The manner in which we do business with local lead agencies has improved dramatically. To cite an example, OMR staff is working closely with members of the City of Irwindale in Southern California to resolve certain active mining related issues there. Because the issues are highly complex and politically sensitive, both the staff within OMR and the staff from the City of Irwindale have had to increase their professionalism and spirit of teamwork a couple of notches to get the job done. What has made this job successful for OMR has been the dedication of everyone in the City of Irwindale, from Mark Braceda the City's honorable mayor, on down. The successes seen in Irwindale are the kind of real change that OMR desires and will be proud to point to as a model for future interactions between OMR and lead agencies.

OMR has seen many other changes, both great and small. The intent of this quarterly **SMARA Update** newsletter is to provide current factual SMARA-related changes and data. It is our hope that this newsletter can be relied on in the future to provide you with the information you will need when changes do occur.

Bill Armstrong
Assistant Director



Reclaimed Coliseum gold mine in San Bernardino County. Future permitted metallic mining operations are required to be backfilled and recontoured (*photo by author*).

New Legislation Requires Backfilling Metallic Mines

The advent of economical cyanide heap leach technology during the 1970s triggered a gold rush across the western United States as miners sought out large low-grade deposits. Mining altered the landscape as millions of tons of ore were heaped into piles next to open pit mines and leached for gold and silver. Many more tons of overburden

and mine waste were piled up around the huge gaping holes in the ground. Most pits were not reclaimed when mining was completed.

Earlier this year the California legislature took steps to ensure that future open pit metallic mineral mines are reclaimed if they are located within a mile of a Native American sacred site and in an area of special concern. Legislation was adopted to protect the Quechan Indian Tribe's "Trail of Dreams" from destruction by a proposed heap leach gold mining operation in Imperial County.

The new law, which was signed by the Governor on April 7th, requires that pits be backfilled to approximate original contours. "This measure sends a message that California's sacred sites are more precious than gold," said Governor Davis. Excess overburden, spoil piles, and heap leach piles that do not fit back in the pit must be graded to achieve the approximate original contours of the land prior to mining. Financial assures must be posted in an amount sufficient to provide for backfilling and grading the mine site when mining is completed.

New regulations adopted by the State Mining and Geology Board take the legislation a step further by requiring all metallic mines in California be backfilled. The new reclamation performance standard requires backfilling of pits to approximate original contours and grading of overburden and leach piles to within 25 feet of the original surface elevations. Backfilling must be engineered to ensure protection of surface water and groundwater resources. Operations that received final approval of a reclamation plan and financial assurance prior to December 18, 2002 are not subject to the new regulations.

Environmentalists hailed the new regulations as necessary to protect land, wildlife, water and people from damage caused when open pits are abandoned in an unreclaimed condition. Industry representatives described the regulations as a ban on gold mining in California. Will this be the end of gold mining in the Golden State? Well, that depends on the price of gold.

*James Pompy
Environmental Program
Manager*

Surety Bonding in Transition for the Mining Industry

California's Surface Mining and Reclamation Act of 1975, as amended (SMARA), requires that all surface mines in the state be converted to a usable condition to support an alternative land use, once mining has ceased or is completed. This process is implemented through a written reclamation plan, which must meet minimum state standards. Reclamation plans are usually approved by the lead agency with land-use planning jurisdiction over the mine site.

To assure that California mines will be reclaimed in accordance with their approved reclamation plans, SMARA requires that mining operators obtain a Financial Assurance (FA), payable to the lead agency and the State Department of Conservation. FA's are intended to protect the public from paying for the cost of reclamation in the event that the mining company goes bankrupt or abandons the mine site. The FA can be one of several different types, but the most common in California has been the surety bond. Other FA options include an irrevocable letter of credit or a trust fund, such as an assigned Certificate of Deposit.

SMARA requires that the financial assurances be adjusted annually. The adjustments are necessary to account for new lands disturbed by mining, inflation, and for lands reclaimed in accordance with the approved reclamation plan during the previous year (PRC 2773.1(a)(3).

Thus, the financial assurances are recalculated from a new base level each year based upon the state of the mining operation for that year. The amount of the required FA should cover the cost to reclaim the mine site in the event that the operation closes during that year. The FA does not need to be calculated based upon the final anticipated state of the land at the planned end of mining. Because all active mines in California need to have their FAs adjusted annually throughout the life of the mine, changes in the availability or cost of FAs are a concern to the mining companies, lead agencies and the State Department of Conservation.

Surety bonds have been an acceptable FA to the Department since the initiation of SMARA, and have historically been attractive to the mining industry because of their relatively low cost compared to other types of FAs. The annual cost of a surety bond generally ranges between 2% and 5% of the total amount of

the bond, depending upon the financial qualifications of the applicant. Recent economic events, however, have made it substantially more difficult for a startup company to obtain a surety bond, or for an already bonded company to increase the amount of its bond for a specific mine site.

To understand why this circumstance has come about, it is necessary to understand surety bonds from the perspective of the surety industry. I am grateful to Kurt Schmal of the Traveler's Bond Company for providing insights into his industry.

First, the surety bond market for mine reclamation is very small. Surety bonds are traditionally provided by insurance companies and represent only about 5% of their business portfolios, with the remaining 95% being insurance of various types. The 5% that is surety bond business can be further partitioned as follows: about 60% of surety bonds are short-term (1-2 year) performance bonds on construction projects of all sizes – from large public works like dams and highways to individual homes; about 15% of surety bonds deal with specialized needs of financial transactions for banks and the finance industry; and, the remaining 25% of surety bonds are commercial in nature, guaranteeing specific performance of the bonded company to fulfill

some obligation. Surety bonds guaranteeing mine reclamation are a small part of this last group. The mining industry is a valued customer of the surety industry, but because its business represents less than ½% of the insurance companies' portfolio, it does not appear to have a major voice affecting insurance company policy.

Second, surety bonds and insurance are fundamentally quite different. Both obviously deal with a certain level of risk, but corporate insurance companies expect that, with insurance, there will be a certain percentage of losses on which the insurer will pay. With life insurance, for example, eventually all policyholders die. With auto insurance, most drivers will make claims. The rates the insured pays for these policies are based on actuarial tables compiled from huge amounts of data, and are structured to accommodate the risks associated with the insurance issued, and still allow the insurance company a profit. Insurance companies then redistribute that risk amongst themselves, through a secondary industry of "re-insurance" companies, lessening the liability of any individual company. The reinsurance companies have historically traded in surety bonds as well as insurance.

With surety bonds, the expectation is that there will be zero

losses. As formally defined, a surety bond is an agreement under which one party, the *surety* (insurance company), guarantees to another party, the *obligee* (the Department and the lead agency in the case of SMARA surety bonds), the performance of an obligation by a third party, the *principal* (the mining operator). As opposed to insurance, a surety bond is more similar to the co-signing or guaranteeing of a loan, and its cost is based not on actuarial tables but on the assets, credit worthiness, business practices, and history of the mining company and of its individual principal owners.

The principal (the mining operator) pays an annual fee, or premium, to the surety (the insurance company) for providing the bond. The rate a company pays for a surety bond is smaller than with insurance because the risk is expected to be zero and bond premiums only cover research costs, auditing, bond maintenance and profit. When the risk for surety bonds turns out not to be zero, the insurance industry reevaluates its position. The recent past has been economically disastrous to the surety industry which has seen record losses in the commercial and construction sectors because of the collapse or financial troubles of such bonded industry giants as WorldCom, Enron, and many large construction firms.

Failures such as these have cost the surety industry millions and millions of dollars, and the nature of the business has become much more expensive in recent years. This makes it considerably more difficult for all bond applicants, including the mining industry to obtain new bonds or to increase the value of those surety bonds already in place.

At a 2% annual bond fee, the default on a single surety bond would take 50 years to recover, but most bonds are in place for only a year or two. The larger the bond, the more impact its forfeiture would have on a single company and the greater its risk. As a result of these recent corporate failures, the reinsurance industry has less of an appetite for reinsuring surety bonds, leaving the issuing company providing the bond with more potential liability. This has resulted in the primary providers of surety bonds taking a much harder look at the companies they are willing to bond. Because of the short-term nature of most surety bonds, the solution surprisingly is not a simple issue of increasing the fees to offset the potential downside liability to the insurer. For that to work, the increased fee for a surety bond would, almost certainly, be noncompetitive with other types of financial assurances.

Third, the length of exposure that an insurance company has with a surety bond is normally rather short – only a few years at most. Most construction projects last a year or less so long-term risk to an insurer is minimal. The project is completed, the performance is adequate, and the bond is terminated to everyone's satisfaction. This is not so with mining projects, which often can last decades, with reclamation taking place only toward the end of the project. A mining company, perceived to be economically healthy and a good risk when the bond was initiated may change for a wide range of reasons over the lifespan of the mine. This ambiguity about the long-term risk troubles the surety industry.

Finally, there is a fundamental economic fact that cannot be ignored. The insurance companies providing the surety bonds are responsible to their policyholders to remain in business, and to their shareholders to be profitable. In the current economic environment, when the insurance division of a company is showing good profits and the surety division is dealing with record losses, prudent business decisions favor the distribution of company resources to insurance rather than surety, further reducing the availability of those bonds.

In conclusion, the surety industry is currently in a state of transition, and not as a result of any negative action of the mining industry. Mining is a very small part of the surety industry and its bonded mine sites are not typical bonded projects in either duration or long-term risk. Other economic factors, including record economic losses and loss of profitability in the surety industry, as well as huge corporate bankruptcies and long-term risk uncertainties, have put the continued availability of inexpensive surety bonds for the mining industry in question. Until this surety bond market volatility stabilizes, mining companies seeking surety bonds face a difficult financial environment, and may need to turn to other forms of financial assurance in order to meet this critical SMARA requirement.

*David Beeby
Supervising Geologist*

OMR's Compliance Unit Report:**Cost Estimate Annual Update and Review**

SMARA requires that mining operations annually obtain Lead Agency approved reclamation financial assurance updates. The State Legislature amended SMARA (Public Resources Code Section 2710 *et seq.*) in 1993 so that the public would not have to pay for reclaiming abandoned surface mining operations.

Annual Mine Inspections

The Lead Agency is required to annually inspect the current mine development and, at the same time, review the financial assurance cost estimate and financial assurance mechanism to insure that sufficient funds are available to reclaim the mining operation. The purpose of the annual financial assurance cost estimate is to support and document the financial assurance amount necessary to reclaim the site according to the Lead Agency approved reclamation plan. Moreover, the financial assurance cost estimate should include a summary of the costs of the individual tasks that are needed to reclaim the mine site to the level specified in the approved reclamation plan. The cost basis used for equipment, labor and

materials, and any other miscellaneous items, must be sufficient so that any third party can successfully implement the reclamation of the mining operation.

Cost Estimation Guidelines

The Department of Conservation currently uses two cost estimation guidelines; (1) the 2003/2004 CalTrans Labor Surcharge and Equipment Rental Rates for equipment costs, and (2) the 2003 General Prevailing Wage Determinations made by the California Division of Labor Statistics and Research for labor costs. Both of these cost sources are available on the CalTrans and Division of Labor Statistics and Research web sites.

For equipment and activities that are not addressed by either the CalTrans rates or the Labor Statistics labor cost the Department uses the RS Means Construction Cost Data Books. Equipment production estimates are performed typically using the Caterpillar Performance Handbook. Other cost sources are available, but they must be based on regional cost summaries for equivalent activities and acceptable by the Department to insure that they are adequate for third party implementation.

Financial Assurance Guidelines

The State Mining and Geology Board (SMGB) has published Financial Assurance Guidelines for mine reclamation. They are available on the Department of Conservation's web page at:

http://www.consrv.ca.gov/SMGB/Guidelines/FA_GD97.pdf.

The SMGB financial assurance guidelines provide the following; a regulatory review of what the State of California Public Resources Code Sections require, recommendations on how to calculate the financial assurance cost estimate, a recommended format for submitting the reclamation cost estimate, and Department accepted financial assurance mechanisms and their accepted form. Most questions regarding reclamation cost estimating, financial assurance mechanisms, and forms can be answered by reviewing the SMGB financial assurance guidelines.

Hard copies of the SMGB financial assurance guidelines are also available from the Department of Conservation's Office of Mine Reclamation (phone number: 916-323-9198). Any questions that may arise outside of the information provided in the SMGB financial assurance guidelines can be addressed by contacting the staff at the Office of Mine Reclamation.

Steve Sager
Senior Mining Engineer

SMGB Executive Officer's Report:**State Senate Confirms Members of the State Mining and Geology Board**

On August 25, 2003, the State Senate confirmed the appointments of Larry Fanning and Julian Isham as new members, and the re-appointments of Allen M. Jones and Robert Griego as returning members, of the State Mining and Geology Board (SMGB).

Mr. Fanning, of Anaheim, is a licensed California Geologist and Certified Engineering Geologist, and has more than 20 years experience in geotechnical consulting. He has been a member of the Association of Engineering Geologists since 1994, and of the American Society of Civil Engineers since 1996. Mr. Fanning, who received a Bachelor of Science Degree from the University of California at Santa Cruz, fills the position on the SMGB as having a background and experience in groundwater hydrology, water quality and rock chemistry.

Mr. Isham, of Antioch, is a licensed California Geologist,

with Certifications in Engineering Geology and Hydrology. He has 30 years of experience in geological engineering, groundwater development, mining, and waste management. Mr. Isham has been a member of the Association of Engineering Geologists since 1973, and the Association of Groundwater Scientists and Engineers since 1991. He, also, has been the chairman of the Legislative Committee of the Board for Geologists and Geophysicists since 1995. Mr. Isham earned a Bachelor of Science Degree from the University of Wisconsin, and fills the position as a mining engineer with background and experience in California.

Mr. Jones, of San Diego, has been a member of the SMGB since his appointment by Governor Davis in 2000. He has served as Vice President of the H. G. Fenton Company since 1990. From 1981 to 1990, Mr. Jones worked for the City of San Diego as Deputy Planning Director. Mr. Jones is a member of the American Planning Association and the Urban Land Institute. He earned a Bachelor of Arts Degree from the University of California at San Diego, and a Master of Science Degree from Colorado State University. Mr. Jones, who also was appointed Chairman of the SMGB by the Governor, fills the position as

having expertise in mineral resource conservation, development, and utilization.

Mr. Griego, of Bonita, has been a member of the SMGB since his appointment by Governor Davis in 2000. He has an extensive background in urban planning and local government, and is the General Manager of the Otay Water District, which serves south San Diego County. He has been a member of the National and California School Board Associations since 1993, and a member of the Association of California Water Agencies since 2000. Mr. Griego earned a Bachelors Degree in Education from San Diego State University, and a Master of Public Administration Degree from the University of California at Los Angeles. Mr. Griego currently is the Vice Chairman of the SMGB, and fills the position as having expertise in local government with a background and experience in urban planning.

*John Parrish, Ph.D.
Executive Officer
State Mining and Geology Board*

SMGB Executive Officer's Report:

State Mining and Geology Board Assumes Lead Agency Powers for El Dorado County and Yuba County

The Surface Mining and Reclamation Act (SMARA, Public Resources Code Section 2710 et seq.) provides for State oversight of local lead agencies (cities and counties) in their administration and enforcement of SMARA, a State law. Under SMARA, the State Mining and Geology Board (SMGB) may assume the SMARA powers of a local jurisdiction if the SMGB finds that the jurisdiction has not adequately performed its administrative and enforcement functions according to the requirements of SMARA. SMARA lists those criteria under Public Resources Code (PRC) Section 2774.4 where a lead agency may run afoul of SMARA's administrative requirements, and provides for the process by which the SMGB may take over SMARA authority from the local lead agency.

El Dorado County

After receiving a continuous

series of complaints from local citizens during 1998 and 1999, the SMGB determined that El Dorado County had not conducted adequate surface mine inspections as required by PRC 2774(b), and following a series of public hearings, took over from the County its SMARA inspection authority in March, 2000. The SMGB conducted inspections of the surface mines in the County subject to SMARA during the Fall of 2000, and concluded that most of the mines in the County were, to a significant degree, out of compliance with SMARA's requirements. The County was notified of these findings.

Following additional public hearings in the Spring of 2001, the SMGB determined to assume the remainder of the County's SMARA authority, which it did in June, 2001. Although the County retains its local permitting authority, the SMGB is responsible for the administration and enforcement of SMARA for the 13 mines within the County.

Yuba County

Also in the Fall of 2000, the SMGB was made aware of problems with Yuba County's SMARA program through a series of complaints and legal actions from a coalition based within the County. The County was notified of the nature of these compliance prob-

lems, and at the County's request, the SMGB provided the County with additional time to bring its SMARA program and surface mines into compliance with State law. However, by the late Fall of 2001, it became apparent that forward progress in rectifying the County's SMARA deficiencies had stalled. After public hearings on the County's SMARA program in February, 2002, the SMGB determined to assume all of the County's SMARA authority. Since that time, the SMGB has been the lead agency for the County's 14 surface mines.

Other Jurisdictions

The SMGB, also, is the SMARA lead agency for 10 cities and the San Francisco Bay Conservation and Development Commission, that do not possess a SMGB-certified surface mining and reclamation ordinance. The affected cities are: American Canyon, Auburn, Compton, Chino Hills, Desert Hot Springs, Palm Springs, Richmond, Rocklin, San Jacinto, and Sutter Creek.

*John Parrish, Ph.D.
Executive Officer
State Mining and Geology
Board*

Abandoned Mine Lands Unit Report:

What's New at the AMLU?

Since it was created in 1996, the Abandoned Mine Lands Unit (AMLU) of the Office of Mine Reclamation has been busy inventorying abandoned mines throughout California. Working with limited staff and limited funds, it has managed to gather onsite information on nearly 2,000 of the estimated 47,000 abandoned mines statewide. The Abandoned Mines Database now contains precise location data, as well as physical and chemical hazard assessment information, on almost 10,000 abandoned mine features. This information is already being used by land management agencies to prioritize their mine sites for further characterization. While one might think this was enough work for the AMLU, last year it expanded its operations to include abandoned mine remediation.

New Challenges

The 2002-03 Budget Act directed the AMLU to split its SMARA funding between inventory work and abandoned mine remediation activities. In other words, the AMLU had to shift gears, scale down its inventory efforts, and develop an abandoned mine remediation



Photo 1. Bat Friendly. This modified "bat cupola" over the Pacific Fluorite Mine, San Bernardino County, shaft allows bats, but not humans, to come and go as they please (*photo courtesy of Frontier Environmental Solutions*).

program with a budget of \$125,000.

This presented a number of problems. Many significant abandoned mine hazards are chemical in nature and extremely costly to remediate. Acid mine drainage, mercury, and other heavy metals in solution are examples of chemical hazards found at abandoned mines that may require extensive remediation efforts. The AMLU's entire \$125,000 budget could easily have been spent remediating only a portion of a single abandoned mine site of this type. In contrast, remediating physical hazards at abandoned mines (such as unmarked shafts, unstable mine workings, and deteriorating structures) is rela-

tively inexpensive. This seemed like the best use for the AMLU's limited remediation dollars.

Unfortunately, the AMLU did not have a priority list of abandoned mine physical hazards. Its previous inventory efforts had been conducted on a watershed basis. That is, all of the abandoned mines in a single, high-priority watershed are inventoried in order to develop priority lists for subsequent characterization and remediation. To use its remediation funds most effectively, the AMLU needed information on abandoned mine physical hazards statewide.

Locating priority abandoned mine physical hazards became



Photo 2. Breaking Ground. A BLM Ridgecrest Field Office employee begins backfilling this hazardous shaft in the Spangler Hills, Kern County. A month earlier, a 14-year-old motorcyclist fell in the shaft, narrowly escaping injury (*photo by author*).

the AMLU's first order of business. AMLU staff contacted dozens of state and federal land management agencies, asking for information on abandoned shafts and adits on their lands that posed the greatest risks to the public. Sites that were near population centers or with high public visitation were given higher priority.

In order to stretch its budget, the AMLU worked with its remediation partners to combine funds and in-kind services. For example, most of the required environmental compliance work was performed by other state and federal agencies. This included preparing all documents needed to satisfy the Califor-

nia Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). In addition to funding, the AMLU provided contract management, materials, and labor. The AMLU also contracted with Frontier Environmental Solutions to construct bat gates and install polyurethane foam closures at many of the sites.

Varieties of Abandoned Mine Remediation Activities

In addition to working with many different partners in geographically diverse areas, the AMLU chose to perform a variety of remediation techniques. Its projects included bat-compatible closures at seven mine features, barbless

wire fencing around 25 features, polyurethane foam closures of 13 shafts and adits, 'blasting shut' – dynamiting – one adit, backfilling six shafts, and demolishing and removing debris from four hazardous and unstable mine structures.

One of the projects involved creating a custom bat-compatible closure for the Pacific Fluorite Mine located on State School Lands in the Clark Mountains of San Bernardino County. The AMLU enlisted the help of Dr. J. Scott Altenbach of the University of New Mexico to perform an internal inspection of the shaft. He determined that the shaft provided likely habitat for one or more species of bats. The State Lands Commission, working with the Department of Fish and Game and the State Office of Historic Preservation, completed all required CEQA documentation. The AMLU then contracted with Frontier Environmental Solutions to design, fabricate, and install a modified bat cupola over the shaft (see Photo 1).

In January 2002, a 14-year-old Fresno boy fell, along with his motorcycle, down an abandoned mine shaft in the Spangler Hills outside of Ridgecrest, California. Luckily, the boy escaped serious harm. News of this accident prompted the AMLU and the Bureau of Land Manage-



Photo 3. Off-Road Hazard. This abandoned mine shaft near Cerro Coso College in Ridgecrest, eastern Kern County, claimed at least three sport utility vehicles over the years. Luckily, no one was seriously injured (*photo courtesy of the BLM*).

windows in homes, this foam is shipped in separate, easily transportable chemical pouches. Once at the abandoned mine site, the chemicals are mixed, causing the foam to expand. Rather than fill an entire shaft with foam, a false bottom is created about ten feet below ground level. Additional foam is then mixed and poured on top. The foam expands to fit the uneven surface of the shaft, creating a tight seal. Once the foam has cooled off, a foot or two of adjacent soil is placed on top, permanently closing the shaft and eliminating the hazard (see Photos 3-6).

ment's (BLM) Ridgecrest Field Office to backfill this dangerous shaft as well as four others nearby. The AMLU paid just \$612.79 for these closures – the cost to rent a backhoe for one day. The BLM performed all of the NEPA documentation and operated the backhoe as well as its own Bobcat (see Photo 2).

The AMLU ended its first year of remediation activity by putting to rest a hazardous shaft that had claimed at least three sport utility vehicles (on separate occasions) (see Photo 3). Working again with the BLM's Ridgecrest Field Office and Frontier Environmental Solutions, the AMLU installed a polyurethane foam (PUF) plug in the shaft. Unlike the foams used to insulate doors and



Photo 4. Preparations for Closure. A Frontier Environmental Solutions crew, with help from BLM staff, lowers a "false bottom" into the shaft. This will provide support for about eight feet of additional polyurethane foam that will seal the shaft. Note how close the shaft is to the roadway (*photo courtesy of the BLM*).



Photo 5. Installing the Foam Plug. Ed Winchester of Frontier Environmental Solutions distributes expanding polyurethane foam on top of the false bottom. The foam expands to fit the contours of the shaft, creating a solid, immovable plug (*photo courtesy of the BLM*).

Of course, the abandoned mine inventory work never stops. This year, the AMLU will be visiting abandoned mine sites in the Middle American River and Middle Feather River watersheds. In the first nine weeks of this year, AMLU staff inventoried 25 abandoned mine sites and cataloged 156 abandoned mine features.

In addition to its first-year partners, the AMLU is working with the National Park Service to perform remediations in the Whiskeytown National Recreation Area and Joshua Tree National Park. It is also working with local agencies, such as the Paradise Irrigation District, to help them remediate hazardous abandoned mine features on their properties.

What's Next?

Another year brings the AMLU the opportunity to find new partners and new abandoned mine remediation projects. The 2003-04 Budget Act retains the AMLU's dual inventory/ remediation focus. The AMLU is already working with other state and federal agencies to locate more abandoned mine hazards that pose serious threats to the public. This year, the AMLU would like to expand its list of partner agencies and explore new methods to remediate abandoned mine hazards.



Photo 6. What Shaft? After the foam plug is installed, two feet of adjacent soil is placed on top, and the hazard is fully remediated (*photo courtesy of the BLM*).

If you know of any abandoned mine features that pose a significant hazard to the public, please contact the AMLU or call its toll-free hotline at 1-877-OLDMINE.

*Douglas Craig
Supervising Environmental
Planner*

AMLU PROJECTS AND PARTNERS

In a little more than seven months, the Abandoned Mine Lands Unit remediated 57 abandoned mine features at 21 sites in eight counties:

Alpine County; 2 projects, 2 features
Kern County; 2 projects, 18 features
Mariposa County; 2 projects, 3 features
Nevada County; 1 project, 1 feature
Plumas County; 1 project, 1 feature
San Bernardino County; 7 projects, 20 features
Sierra County; 5 projects, 9 features
Trinity County; 1 project, 3 features

The AMLU partnered with nine separate agencies within two branches of the federal government:

U.S. Forest Service

- Humboldt-Toiyabe National Forest; 2 projects, 2 features
- Plumas National Forest; 1 project, 1 feature
- Shasta-Trinity National Forest; 1 project, 3 features
- Tahoe National Forest; 6 projects, 10 features

U.S. Bureau of Land Management

- Barstow Field Office; 1 project, 9 features
- Folsom Field Office; 2 projects, 3 features
- Lake Havasu Field Office (Arizona); 1 project, 1 feature
- Needles Field Office; 2 projects, 2 features
- Ridgecrest Field Office; 3 projects, 21 features

The AMLU also worked with the following state departments in its remediation efforts:

State Lands Commission
Department of Fish and Game
State Office of Historic Preservation
California Conservation Corps
Prison Industry Authority

The AMLU contracted with Dr. J. Scott Altenbach, of the University of New Mexico's Department of Biology, to inspect two deep abandoned mine shafts for possible bat habitat.

Finally, for assistance in designing bat-compatible gates and cupolas, the AMLU worked closely with Bat Conservation International.

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**Questions or Comments?
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The **SMARA Update** is a quarterly publication of:

Department of Conservation's Office of Mine Reclamation
801 K Street, MS 09-06
Sacramento, CA 95814
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Our web site address is <http://www.consrv.ca.gov/omr>. The purpose of this publication is to impart the latest reclamation tips, as well as changes in SMARA-related legislation or interpretation of existing statutes by court decisions.

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